

Earth's Materials and Changes

3-3 The student will demonstrate an understanding of Earth's composition and the changes that occur to the features of Earth's surface. (Earth Science)

3-3.1 Classify rocks (including igneous, sedimentary, and metamorphic) and soils (including humus, clay, sand, and silt) on the basis of their properties.

Taxonomy level: 2.3-B Understand Conceptual Knowledge

Previous/Future knowledge: In 1st grade (1-4.1), students recognized that Earth was composed of rocks, sand, soil, and water. Sand and rocks were classified by physical appearance (1-4.2) and soil was sorted by properties (1-4.3). Students have not previously identified the names or properties of the types of rocks or soils. Students will further develop the concept of soil properties in 7th grade (7-4.4) and will explain the relationships between the types of rocks in the rock cycle in 8th grade (8-3.4).

Classify Rocks

It is essential for students to know that there are three classifications of rocks – igneous, sedimentary, and metamorphic. Rocks can be classified by properties, such as how they are formed, color, visible crystals or minerals, grain pieces, patterns in the rock such as stripes.

Igneous

- Igneous rock was once melted but it has cooled and hardened.
- The melted material is called *magma* or *lava*.
- Igneous rocks may be glassy or grainy with crystals of different types of minerals in them.
- Granite is an example of an igneous rock.

Sedimentary

- Sedimentary rocks are usually made up of pieces of rock called *sediments* that have been pressed and cemented together.
- Some may contain pieces of animal shells or skeletons or other remains of plants or animals.
- Sandstone and limestone are examples of sedimentary rocks.

Metamorphic

- Metamorphic rock was once another type of rock deep inside Earth, but heat and the pressing of the rocks above caused the minerals to change.
- Rocks that were pressed down could have the minerals line up in rows or bands.
- Sometimes the heat just changes the size of the mineral crystals.
- Marble and slate are examples of metamorphic rocks.

It is not essential for students to know classifications within each type of rock. The relationship between the groups of rocks as explained by the rock cycle is also not necessary here.

Classify Soils

It is essential for students to know that soil can be classified based on content, texture, or grain size. Types of soil include humus, sand, clay, and silt.

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Humus

- Humus is soil that is made up of decayed parts of once-living organisms.
- It is dark, soft, and very crumbly.

Sand

- Sand has large grains with large spaces between the grains.
- This lets water leave it quickly. Sand feels gritty.

Clay

- Clay has very small grains, much smaller than sand or silt, and holds water easily.
- This makes clay sticky when wet, but when it dries, it forms hard clumps.

Silt

- Silt has pieces that are smaller than sand. It feels like powder.

Some soils are combinations of these soil types. For example, “*loam*” soil has large and small grains with lots of humus. This makes it dark and rich soil for plants. Another example, “*potting soil*” or “*topsoil*”; also has a lot of humus. Once some sand has been added to it, it is also good for growing plants.

It is not essential for students to know soil profiles or the layers of soil. The relationship between the groups of rocks is explained by the rock cycle. Soil conservation is also not necessary but can be a good class discussion because of the importance of soil as a resource.

Assessment Guidelines:

The objective of this indicator is to *classify* types of rocks and soil; therefore, the primary focus of assessment should be to group rocks and soils by the properties used to describe them. However, appropriate assessments should also require students to *recognize* a particular rock or a soil type based on the description; *exemplify* rocks that are classified as a particular type; or *recall* how a particular rock type was formed.